

IN THE CLAIMS

Cancel claim 9, amend claims 1, 7, and 8, and add claims 10-14 as follows:

1. (amended twice) A web inspection system for detecting a plurality of web flaws
2 of a web, the web inspection system comprising:

3 a plurality of smart cameras for generating a digital pixel representation of a
4 portion of the web, each smart camera for detecting the plurality of
5 web flaws from the digital pixel representation and for generating ~~flaw~~
6 ~~image data and~~ output data comprising a digitized image of each flaw
7 of the plurality of web flaws and for generating flaw location data for
8 each flaw of the plurality of web flaws;

9 a host computer for controlling the web inspection system and for receiving
10 and displaying the flaw image data and the flaw location data; and
11 an ethernet for connecting the plurality of smart cameras to the host
12 compute, wherein the flaw image data and the flaw location data is
13 transmitted over the ethernet from the plurality of smart cameras to
14 the host computer.

2. (previously amended) The web inspection system of claim 1, wherein each smart
2 camera of the plurality of smart cameras comprises:

3 a line scan camera for generating the digital pixel representation of a portion
4 of the web;

5 a lighting uniformity and pixel sensitivity correction means for correcting each
6 pixel of the digital pixel representation and for providing a corrected
7 pixel representation;

8 a web edge detector for detecting at least one edge of the web;

9 a multi-pipeline pre-processor for filtering the corrected pixel representation,
10 the multi-pipeline preprocessor generating a prioritized data stream

of potential flaws;

- 12 a run length encoder for generating location data regarding a location of
each group of the potential flaws in a cross direction;
- 14 a blob detector for generating block data regarding the location of blocks of
the potential flaws along a machine direction; and
- 16 an inspect/reject analyzer for determining actual flaw data from the
prioritized data stream of potential flaws.

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3. (previously amended) The web inspection system of claim 2, wherein the multi-
2 pipeline processor comprises:

- a plurality of filters for averaging the corrected pixel representation over a
4 distance of the web along a machine direction of the web;
- a plurality of adaptive background subtraction channels connected to the
6 plurality of filters, each adaptive background subtraction channel of
the plurality of adaptive background subtraction channels producing
8 a stream of subtracted pixel representations;
- a plurality of thresholders, each thresholder of the plurality of thresholders
10 connected to an output of an adaptive background subtraction
channel of the plurality of adaptive background subtraction channels,
12 each thresholder for grouping at least a portion of the stream of
subtracted pixel representations and for producing an thresholder
14 group output; and
- a priority logic circuit for prioritizing the thresholder group output of each of
16 the plurality of thresholders.

4. (previously amended) The web inspection system of claim 3, wherein the plurality
2 of filters comprises:
a background filter;

4 a machine direction streak filter;
a cross direction streak filter; and
6 a small flaw filter.

5. (previously amended) The web inspection system of claim 3, wherein the
2 plurality of thresholders comprises:

3 a single pixel flaw detector;
4 a uniformity detector;
a machine direction streak detector;
6 a cross direction streak detector; and
a small flaw detector.

6. (previously amended) The web inspection system of claim 1, wherein each smart
2 camera of the plurality of smart cameras detects the plurality of web flaws from the
the digital pixel representation at a contrast approaching a signal noise level.

7. (amended twice) A method for low contrast web inspection of a web, the method
2 comprising the steps of:

3 providing at least one smart camera for ~~inspecting at least a portion of the~~
4 ~~web~~ detecting at least one flaw on the web, wherein ~~inspecting at~~
~~least a portion of~~ detecting the at least one flaw on the web comprises
6 the steps of;
generating flaw image data of the at least one flaw, the flaw image
8 data comprising an area of pixels having a length and a width
~~flaw image data and~~
10 generating flaw location data for locating the at least one flaw on ~~of~~
~~the at least a portion of the web~~; and
12 transmitting the flaw image data and flaw location data over an

14 ethernet to a host computer; and
displaying the flaw image data and flaw location data on the host computer.

8. (amended twice) The method of claim 7, wherein the step of generating the flaw
2 image data and flaw location data comprises the steps of:

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4 generating a pixel representation of the at least a portion of the web;
correcting the pixel representation for a lighting uniformity and a pixel
sensitivity;
6 filtering the corrected pixel representation utilizing a plurality of filters;
grouping the filtered corrected pixel representations to generate a plurality
8 of potential flaw data streams;
generating a prioritized data stream from the plurality of potential flaw data
10 streams;
generating cross direction location data regarding a location of the prioritized
12 data stream;
generating block data regarding the location of blocks of the prioritized data
14 stream along a machine direction; and
~~determining actual flaw data~~ generating the flaw image data from the
16 prioritized data stream of potential flaws utilizing the cross direction
location data and the block data.

9. (cancelled)

--10. (new) A web inspection system for detecting a flaw of a plurality of possible

2 flaws on a web, the web inspection system comprising:

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4 at least one smart camera for generating a digitized video data stream of a
flaw on a portion of the web, the at least one smart camera comprising:
a background filter for averaging the digitized video data stream over a first

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6 area of the web to generate an averaged background signal;
a machine direction streak filter for averaging the digitized video data stream
8 over a distance of the web along a machine direction of the web to
generate a filtered machine direction signal ;
10 a cross direction streak filter for averaging the digitized video data stream
over a distance of the web along a cross direction of the web to
12 generate a filtered cross direction signal;
a first adaptive background subtraction channel for subtracting the averaged
14 background signal from the filtered machine direction signal to
generate a first pixel representation;
16 a second adaptive background subtraction channel for subtracting the
averaged background signal from the filtered cross direction signal to
18 generate a second pixel representation;
at least one multi-group thresholder for grouping the first and second pixel
20 representations to generate at least two data streams of potential
flaws; and
22 a priority logic circuit for prioritizing the at least two data streams of potential
flaws to generate the digitized video data stream of the flaw.

11. (new) The web inspection system of claim 10, wherein the at least one multi-
2 group thresholder comprises:

4 a machine direction streak detector for detecting a narrow streak in the
machine direction; and
a cross direction streak detector for detecting a narrow streak in the cross
6 direction.

12. (new) The web inspection system of claim 10, further comprising:
2 a small flaw filter for averaging the digitized video data stream over a second

- 4 area of the web to generate an averaged small flaw signal; and
6 a third adaptive background subtraction channel for subtracting the averaged
background signal from the average small flaw signal to generate a
third pixel representation; and
8 a small flaw detector for detecting a small block flaw from the third pixel
representation.

13. (new) The web inspection system of claim 10, further comprising a single pixel
2 adaptive background subtraction channel for subtracting the averaged background
signal from the digitized video data stream, an output of the single pixel adaptive
4 background subtraction channel coupled to a single pixel flaw detector having an
output of single pixel flaws.

14. (new) The web inspection system of claim 10, further comprising a uniformity
2 detector having an input of the averaged background signal, the uniformity detector
for outputting a block flaw signal.--
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